

## CLAIMS

What is claimed is:

1. A method of detecting leaks in a fuel tank without having to remove  
5 the fuel tank from the mobile platform, the fuel tank being disposed within a cavity defined by mobile platform supporting structure, the method comprising:  
sealing a cavity annulus defined generally between the fuel tank  
and the mobile platform supporting structure;  
introducing pressurized fluid into the cavity annulus to cause  
10 pressurized fluid to flow from the cavity annulus through a leak into the fuel tank;  
monitoring the fuel tank to detect leakage of pressurized fluid into the fuel tank; and  
wherein the fuel tank remains disposed within the cavity defined by  
15 the mobile platform supporting structure during said sealing, introducing, and monitoring.
2. The method of claim 1, wherein:  
the introducing comprises introducing helium into the cavity  
20 annulus; and  
the monitoring comprises using a helium detection device within the fuel tank to detect helium leakage into the fuel tank.
3. The method of claim 1, further comprising repairing detected leaks  
25 without removing the fuel tank from the cavity defined by the mobile platform supporting structure.
4. The method of claim 1, wherein the monitoring comprises locating  
an origin of pressurized fluid leakage into the fuel tank.  
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5. The method of claim 4, wherein the locating:  
isolating a portion within the fuel tank; and  
detecting leakage of pressurized fluid into the isolated portion.

6. The method of claim 5, wherein  
the isolating comprises positioning an isolation cup over a fitting  
within the fuel tank; and  
the detecting comprises using a detection device in communication  
5 with the isolation cup to detect leakage of pressurized fluid into the  
isolation cup.

7. The method of claim 6, further comprising removably coupling a  
corresponding one of a plurality of isolation cups to the detection device.  
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8. The method of claim 1, further comprising testing the sufficiency of  
the sealing of the cavity annulus.

9. The method of claim 8, wherein the testing comprises:  
15 introducing a different pressurized fluid into the cavity annulus; and  
monitoring the pressurized cavity annulus for leaks.

10. The method of claim 1, wherein the mobile platform comprises an  
aircraft.

11. A method of detecting leaks in an internal pressure vessel, the method comprising:

forming a pressurizing cavity external to and adjacent the internal pressure vessel;

5 introducing pressurized fluid into the pressurizing cavity to cause pressurized fluid to flow from the cavity through a leak into the internal pressure vessel; and

monitoring the internal pressure vessel to detect leakage of pressurized fluid into the internal pressure vessel.

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12. The method of claim 11, wherein the internal pressure vessel is disposed and remains disposed within a cavity defined by supporting structure during said forming, introducing, and monitoring.

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13. The method of claim 12, wherein:

the forming comprises sealing a cavity annulus defined generally between the internal pressure vessel and the supporting structure; and

the introducing comprises introducing pressurized fluid into the cavity annulus.

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14. The method of claim 12, further comprising repairing detected leaks without removing the internal pressure vessel from the cavity defined by the supporting structure.

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15. The method of claim 11, wherein:

the introducing comprises introducing helium into the pressurizing cavity; and

the monitoring comprises using a helium detection device within the internal pressure vessel to detect helium leakage into the internal pressure vessel.

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16. The method of claim 11, wherein the monitoring comprises locating an origin of pressurized fluid leakage into the internal pressure vessel.

17. The method of claim 16, wherein the locating:  
isolating a portion within the internal pressure vessel; and  
detecting leakage of pressurized fluid into the isolated portion.
- 5 18. The method of claim 17, wherein  
the isolating comprises positioning an isolation cup over a fitting  
within the internal pressure vessel; and  
the detecting comprises using a detection device in communication  
with the isolation cup to detect leakage of pressurized fluid into the  
10 isolation cup.
19. The method of claim 18, further comprising removably coupling a  
corresponding one of a plurality of isolation cups to the detection device.
- 15 20. The method of claim 11, further comprising testing the  
pressurization sufficiency of the pressurizing cavity.
21. The method of claim 20, wherein the testing comprises:  
introducing a different pressurized fluid into the pressurizing cavity;  
20 and  
monitoring the pressurizing cavity for leaks.
22. The method of claim 11, wherein the internal pressure vessel  
comprises an internal fuel tank.

23. A method of locating leaks in an internal pressure vessel without having to remove the internal pressure vessel from a cavity defined by supporting structure in which the internal pressure vessel is disposed, the method comprising:

5                    sealing a cavity annulus defined generally between the internal pressure vessel and the supporting structure;

                  introducing pressurized fluid into the cavity annulus to cause pressurized fluid to flow from the cavity annulus through a leak into the internal pressure vessel;

10                  positioning an isolation cup over a fitting within the internal pressure vessel;

                  using a detection device in communication with the isolation cup to detect leakage of pressurized fluid into the isolation cup; and

15                  wherein the internal pressure vessel remains disposed within the cavity defined by the supporting structure during said sealing, introducing, positioning, and using.

24. The method of claim 23, further comprising removably coupling a corresponding one of a plurality of isolation cups to the detection device.

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25. The method of claim 23, wherein the introducing comprises introducing helium into the cavity annulus.

26. The method of claim 23, further comprising repairing detected leaks  
25 without removing the internal pressure vessel from the cavity defined by the supporting structure.